"SPORT SHOE WITH IMPACT ABSORBER SYSTEM"

The present invention refers to a sport shoe providing an impact absorber system, these impact being generated by the athlete's feet. The absorption system comprises resilient or elastic tubular elements grouped in a parallel mode, and arranged side by side one another over the sole region of the shoe, generally on the heel region, although it can be inserted in two or three sole regions, in this last option occupying almost all shoe sole.

It should be pointed out that the absorption system of this invention contributes to correct athlete's paces, preserving their efficiency and security, as well as entailing a longer duration to the shoe itself.

The resilient tubes (in this text we will use the word "resilient" although the referred to tube can be manufactured with elastic or compound material) are arranged in a parallel mode one another and placed transversally to the shoe longitudinal axis, arranged adjacent or very close one another.

Basically these tubes are cylinders of elliptical cross section although they can be manufactured in a cylinder shape of circular section, or any other compound cross-section shape .

The material basically preferred to be used in the manufacture of the sport shoe impact absorber resilient system of the invention is the plastics, although other materials can be used, provided that they are adequate to the usage functions.

Thus, also are specified in accordance with the destination the tube wall thickness as well as the respective diameters, and also the size of each tube, its form, and the distance among them.

Each set of three tubes is closed laterally by walls on both

opposed extremities of the set. The aim of these walls is to both static and dynamically stabilize each set, keeping them functionally firm during the shoe usage avoiding, or at least soothe, the distortion - the shoe inclination due to wrong, inclined, of user step -, during sport activities.

The interior of each tube contains basically air, but any other materials that result in special performances, for particular applications, can be inserted into the interior of these tubes.

It becomes evident that all features of the absorber set of this invention have a design proportional to the user's weight, i. e., the athlete using this sport shoe. Besides, the shoe aims each different type of the athlete's activity.

The invention will be better understood and appraised by way of drawings, represented by figures which are shortly described as follows, when compared with the description text that is submitted further on.

Figure 1 is a perspective of the sport shoe of the invention, showing the position of the impact absorber tubular set in relation to the sport shoe.

Figure 2 is a perspective of the absorber tubular set, showing also the shoe insole.

Figure 3 is a front view of the absorber set as limited by two opposed lateral walls.

Figures 4, 5 and 6 are application versions for the impact absorber tubular sets, respectively in the heel area, in the heel and front third area, and set applied to the whole user foot plant.

Figure 7 is a comparison of diagrams for the tubular set: in rest,

and the same set under user's foot pressure.

Figures 8, 9 and 10 are schematic cross section/views of an user's foot as applied to tubes in a certain impact absorber set at three usage different conditions.

Figure 11 is a schematic cross section of an user's foot before stepping on a impact absorber set, and this same figure illustrates what happens after the foot makes no more pressure on the tubular set.

Figure 12 is a schematic cross section of a foot making pressure on the absorber set, showing the deformations which result from this pressure.

By figure 1 and the following figures one can apprise that the impact absorber system 4 of this invention, in a preferred embodiment, is embedded into the sole 1 of a sport shoe, as the higher weight applied to the shoe by the user's foot concentrates exactly on the heel region, where the [absorber] set is placed.

In the case of a sport shoe, the insole 2 occupies the front two thirds of the shoe, and the shoe body covers all superior part of the shoe.

Figure 2 of the drawings illustrates the shoe impact absorber set 4, showing tubes 6, 7 and 8 which form the impact absorber system, and the side walls 5, in each extremity of the set 4. These side walls act as stabilizers against the resilient deformation of the tubes 6, 7 and 8, and still serve as a closing for the set 4.

The tubes can be manufactured in size, thickness and format different from one another, and have as an option for the fabrication, the employment of plastics, resin, flexible polymers, or any other materials that will

be invented and show themselves as adequate to perform the functions they exert in the shoe, as, e.g., compound application for elastic and resilient materials.

It is showed a tubular set of three tubes, but it is clear that each set can be manufactured with a different of tubes.

Basically, and within the inventive concept of the present invention, tube 6 receives the initial impact of the athlete's foot, performing the transition for the central tube 7, which carry out the main impact absorption, since the load received in this [tube] is of highest intensity. Tube 8 responds for the final absorption, when the athlete's foot does not exert any more pressure on the sport shoe.

Figure 3 emphasizes the position of the side walls 5, which close the tubular set 4, providing balance and stability to the same, and transferring this stability to the athlete.

Figure 4 shows position A, at the heel, of the absorber 4 with relation to the athlete's foot.

Figure 5 illustrates the positions B and C for the absorber sets 4 on the heel and front third of the athlete's foot sole.

Figure 6 shows the application of three absorbers 4 on the positions D, E and F of athlete's foot, covering practically all athlete's foot sole, and receiving, thus, the full impact from the beginning to the end of the athlete's foot pressure.

Figure 7 comprises two schemes: one set of 3 tubes without pressure, containing material H in the interior of each tube, and an absorber set of 3 tubes under pressure showing not only the tubes 6, 7 and 8, deformed by

the compression, but also the material J compressed by the athlete's foot pressure. It is necessary to emphasize that the substance of the internal material of the tubes of the sets 4 may vary in accordance with each specific application for the sport shoe of this invention.

Figures 8, 9 and 10 illustrate three conditions of dynamic impact of the athlete's foot over the tubes 6, 7 and 8 by generating different pressures and deformations on these tubes.

Figure 8 shows the athlete's foot [in the moment of] touching the absorber 4; figure 9 shows athlete's foot compressing the absorber 4 completely, and figure 10 shows athlete's foot decreasing pressure on the impact absorber 4.

Figures 11 and 12 illustrate schematically, respectively, the absorber 4 without pressure on the athlete's foot - before the impact and after the impact -, and under athlete's pressure, the sheet K being showed before and during the deformation owing to the impact.

It should be advised that small alterations included in this invention become incorporated to the protection established by the enclosed claims.